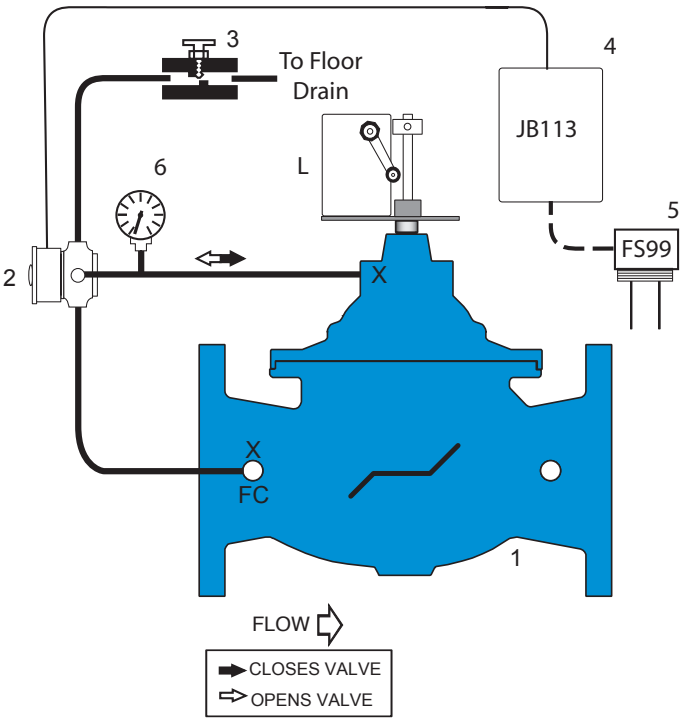
FLOOD PROTECTION SHUT DOWN VALVE
(3" AND SMALLER)

01/10

CLASSIC SERIES

F113-12RFP (Globe)
F1113-12RFP (Angle)



- Installed upstream of Reduced Pressure Zone Backflow Preventer.
- Normally Open Valve - Closes when discharge from RPZ Relief Valve is sensed or by engaging Solenoid Manual Operator.
- Limit Switch provides local visual and remote electrical indication of valve closure.
- Valve must be manually reset. Pressure gauge (provided) indicates valve reset for automatic service
- Anti-Scale Coated Main Valve Stem for added protection.
- Fail Safe operation - Valve closes upon Main Valve or Pilot Diaphragm failure.

Standard Components

1 - Main Valve (Single Chamber)
2 - 3-Way Solenoid
3 - Manual Reset Ball Valve
  Port 1 - Valve Cover
  Port 2 - Pressure
  Port 3 - Atmosphere
4 - JB113 Junction Box
5 - FS99 Flow Sensor
6 - Pressure Gauge
L - Limit Switch
X - Isolation Cocks
FC - Flo-Clean Strainer

Operations

The Watts Flood Protection Shutdown Valve system prevents catastrophic property damage that can occur due to Relief Valve discharge and/or a blocked or overwhelmed floor drain during normal relief valve operation. Typical conditions which can cause continuous relief valve discharge are:

- Fouled First Check Seat due to dirt, debris or rocks
- Failed First Check Spring
- Clogged or blocked Relief Valve Sensing Line
- Relief Valve Diaphragm failure

The Watts 113-12RFP Flood Protection Shutdown Valve is a normally open valve designed to be installed upstream of a Reduced Pressure Zone (RPZ) Backflow Prevention device. It is normally open and closes drip-tight when continuous relief valve discharge through the drain pipe is sensed by the FS99 Flow Sensor, energizing the Solenoid Pilot. The Solenoid Pilot is equipped with a Manual Operator which simulates power when manually engaged. The valve mounted JB113 Junction Box is equipped with an adjustable time delay to avoid valve closure due to intermittent or nuisance relief valve discharge. The Limit Switch provides local visual and remote electrical indication of valve closure. The valve remains closed and cannot re-open if flow stops or electrical service is interrupted, and must be manually reset after the RPZ is diagnosed and/or repaired.

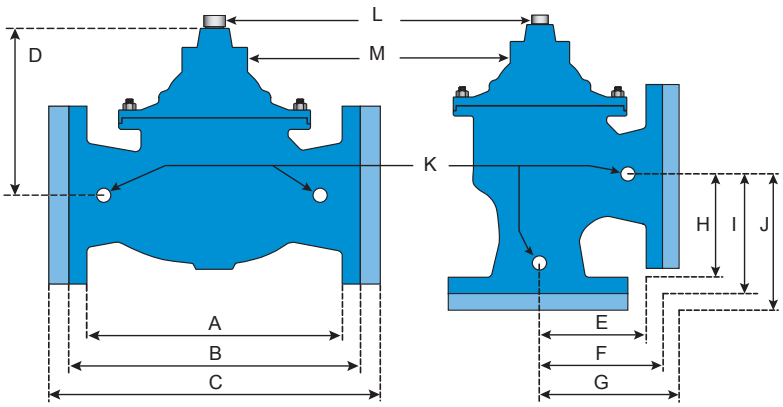
The valve comes complete with the valve mounted JB113 Junction Box with adjustable time delay, pre-wired Solenoid Valve, Manual Reset with Pressure Gauge, Limit Switch and FS99 Flow Sensor (field installed). Fail-safe operation is assured by closing valve upon Main Valve or Pilot Diaphragm failure and a specially coated Main Valve Stem for added protection.

F113-12RFP (Globe)
F1113-12RFP (Angle)

Materials

Body & Cover:	Ductile Iron ASTM A536
Coating:	NSF Listed Fusion Bonded Epoxy Lined and Coated
Trim:	316 Stainless Steel
Elastomers:	Buna-N (standard) EPDM (optional) Viton (optional)
Stem, Nut & Spring:	Stainless Steel

Globe Angle



Operating Pressure

Threaded = 400 psi
150 Flanged = 250 psi
300 Flanged = 400 psi

Operating Temperature

Buna-N: 160°F Maximum
EPDM: 300°F Maximum
Viton: 250°F Maximum

Pilot System

Solenoid
Brass
NEMA 4 General Purpose
110-VAC

Tubing & Fittings

Copper / Brass (Standard)
Stainless Steel (Optional)

Dimensions

	A	B	C	D	E	F	G	H	I	J	K	L	M	
VALVE SIZE	GLOBE THRD.	GLOBE 150#	GLOBE 300#	COVER TO CENTER	ANGLE THRD.	ANGLE 150#	ANGLE 300#	ANGLE THRD.	ANGLE 150#	ANGLE 300#	PORT SIZE	PORT SIZE	PORT SIZE	SHIPPING WEIGHTS*
1-1/4	7-1/4	-	-	3-1/2	3-1/4	-	-	1-7/8	-	-	1/4	1/2	1/8	15
1-1/2	7-1/4	8-1/2	9	3-1/2	3-1/4	4	-	1-7/8	4	-	1/4	1/2	1/8	15
2	9-3/8	9-3/8	10	4-15/16	4	4	4-1/4	4	4	4-1/4	1/2	1/2	1/4	35
2-1/2	11	11	11-5/8	7	5-1/2	5-1/2	5-13/16	4	4	4-5/16	1/2	1/2	3/8	65
3	10-1/2	12	13-1/4	7	5-1/4	5-3/4	6-1/8	5-1/4	5-3/4	6-1/8	1/2	1/2	3/8	95
4	-	15	15-5/8	8-5/8	-	6-3/4	7-1/8	-	6-3/4	7-1/8	1/2	1/2	3/8	190
6	-	20	21	11-3/4	-	8-1/2	8-7/8	-	8-1/2	8-7/8	1/2	1/2	1/2	320
8	-	25-3/8	26-3/8	15-3/4	-	11	11-1/2	-	11	11-1/2	1/2	1	1/2	650
10	-	29-3/4	31-1/8	18-3/4	-	14-7/8	15-5/8	-	14-7/8	15-5/8	1	1	1	940

For larger sizes consult factory

Valve Cover Chamber Capacity

Valve Size (in)	1-1/4	1-1/2	2	2-1/2	3	4	6	8	10
fl.oz.	4	4	4	10	10	22	70	-	-
U.S. Gal	-	-	-	-	-	-	-	1-1/4	2-1/2

Valve Travel

Valve Size (in)	1-1/4	1-1/2	2	2-1/2	3	4	6	8	10
Travel (in)	3/8	3/8	1/2	5/8	3/4	1	1-1/2	2	2-1/2

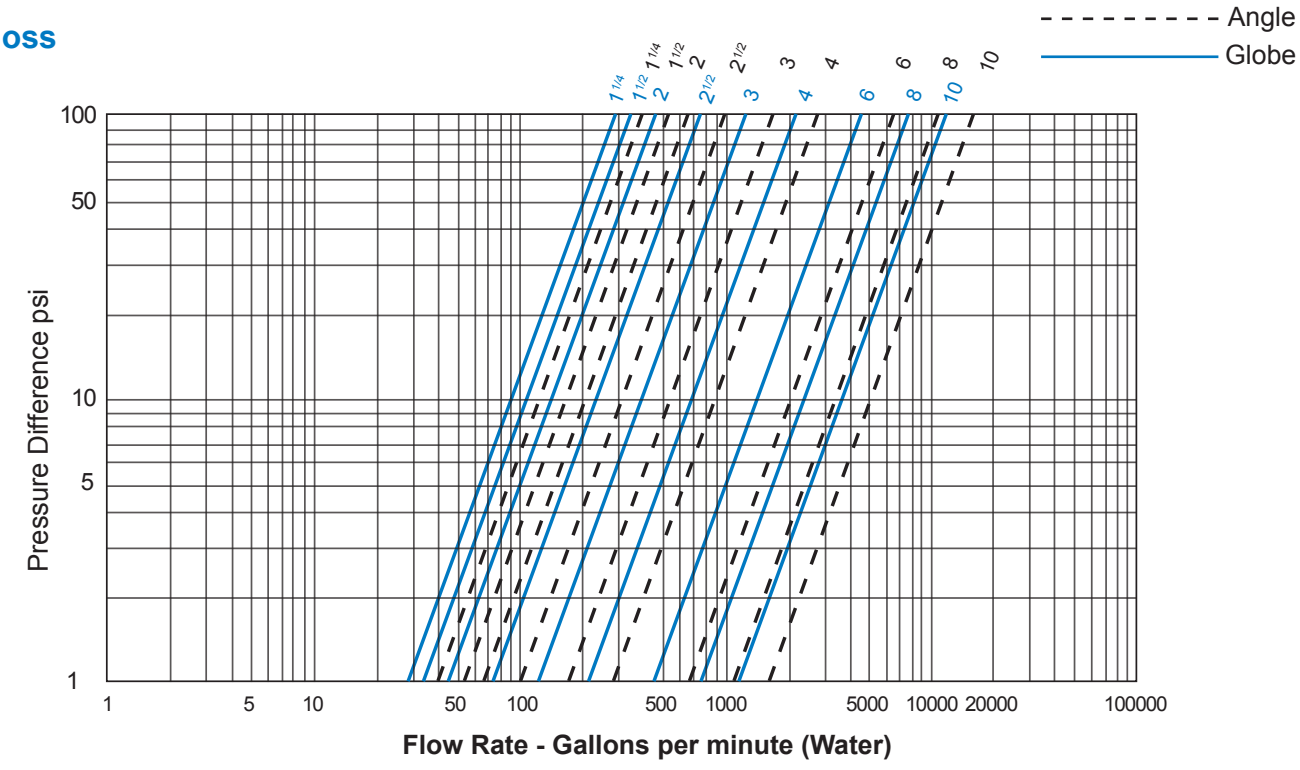
Flow Data

Valve Size - Inches	1-1/4	1-1/2	2	2-1/2	3	4	6	8	10
Maximum Continuous Flow Rate Gpm (Water)	93	125	208	300	460	800	1800	3100	4900
Maximum Intermittent Flow Rate Gpm (Water)	115	158	260	370	570	1000	2300	3900	6000
CV Factor GPM (Globe)	29	34	55	75	125	220	460	775	1200
CV Factor GPM (Angle)	39	53	66	99	170	280	650	1100	1600

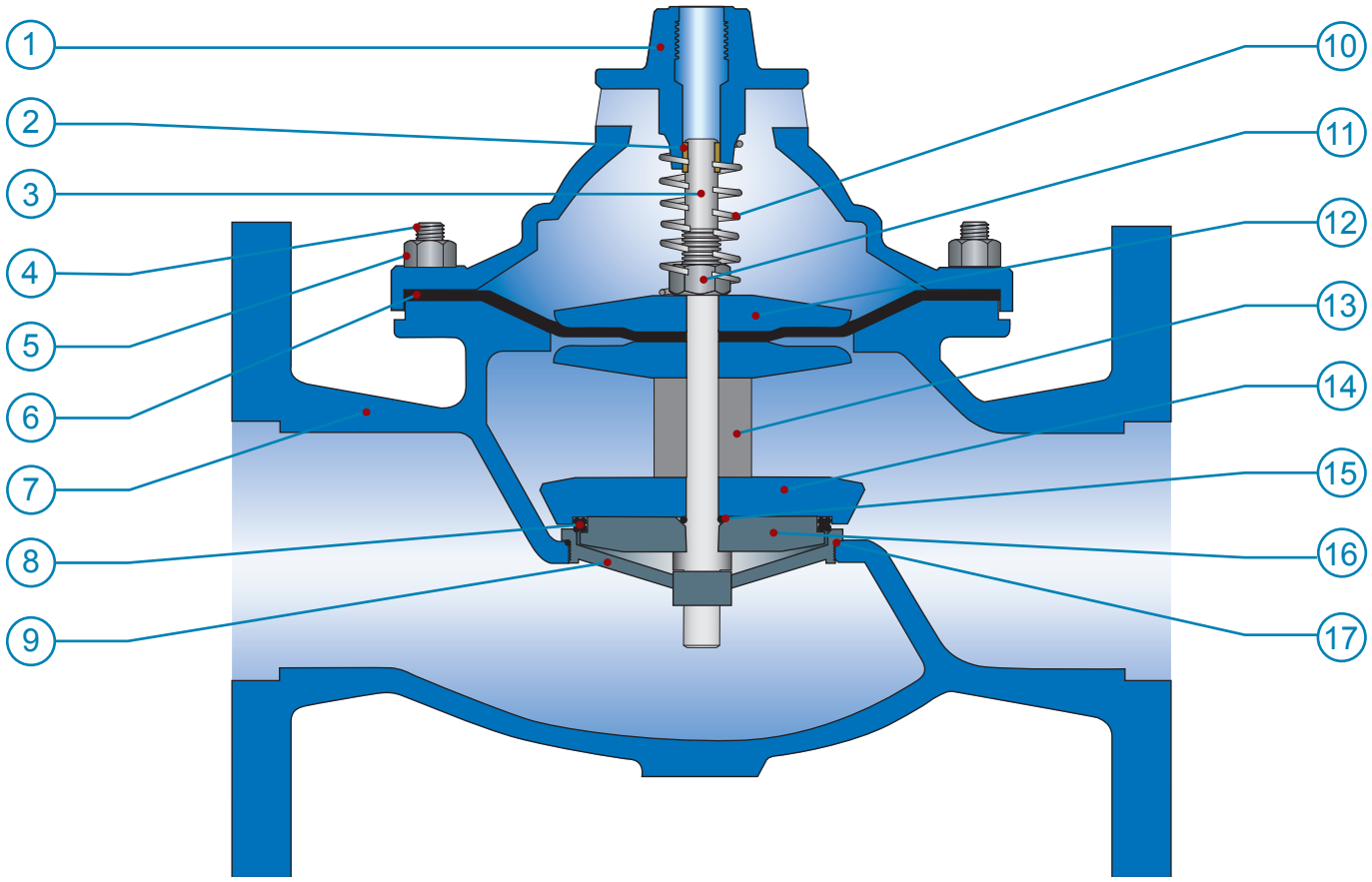
Maximum continuous flow based on velocity of 20 ft. per second.
Maximum intermittent flow based on velocity of 25 ft. per second.
The C_v Factor of a value is the flow rate in US GPM at 60° F that will cause a 1 psi drop in pressure.
The factors stated are based upon a fully open valve.
Cv factor can be used in the following equations to determine Flow (Q) and Pressure Drop (Δ P):

Q (Flow) = $C_v\sqrt{\Delta P}$ Δ P (Pressure Drop) = $(Q/C_V)^2$

Headloss



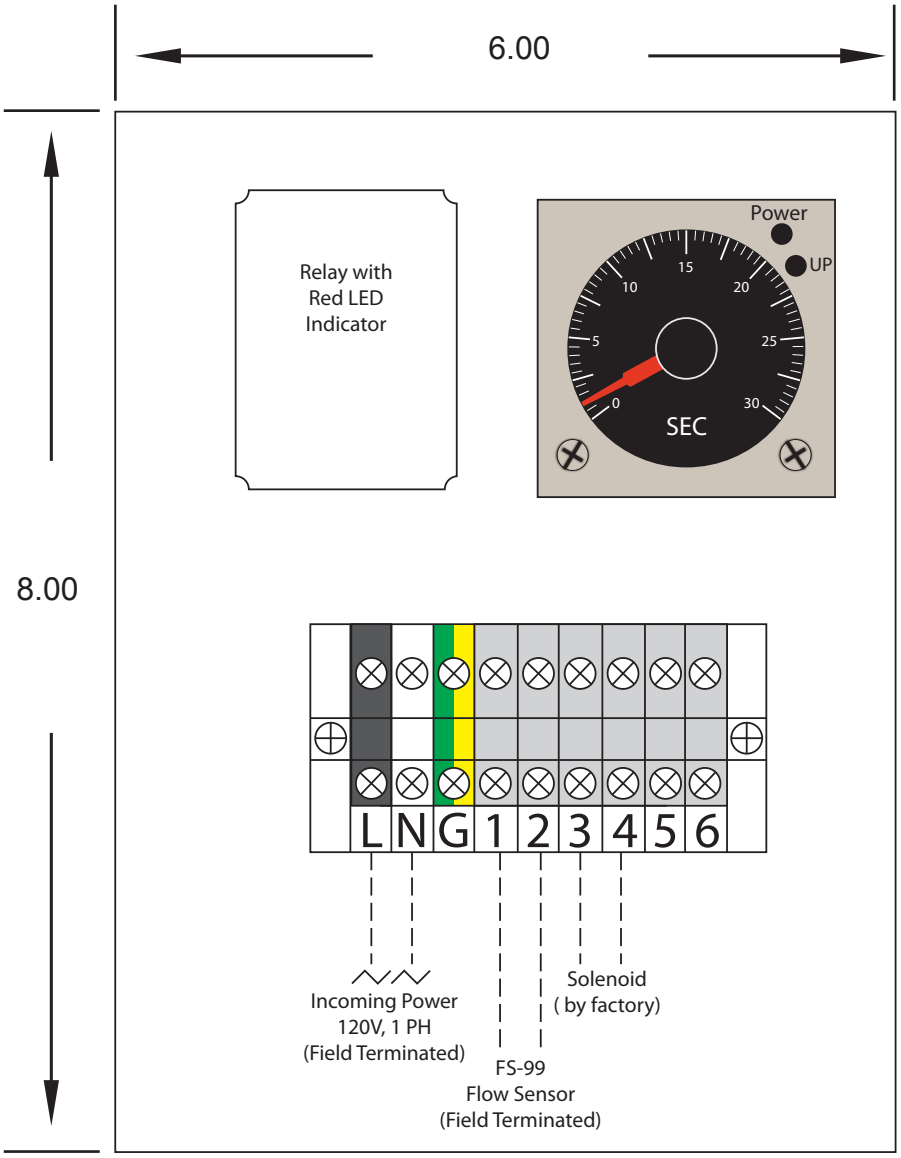
Main Valve



ITEM	DESCRIPTION	MATERIAL
1	Cover	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
2	Cover Bearing	SAE 841 Bronze
3	Shaft / Stem	ASTM A276 304 Stainless Steel
4	Stud	ASTM A570 Gr.33 Zinc Plated Steel
5	Cover Nut	ASTM A570 Gr.33 Zinc Plated Steel
6	**Diaphragm***	Buna-N (Nitrile)
7	Body	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
8	**Quad Seal***	Buna-N (Nitrile)
9	Seat Ring	ASTM A743 CF8M (316) Stainless Steel (8” and Smaller) ASTM B62 Bronze (10” and Larger)
10	Spring	ASTM A276 302 Stainless Steel
11	Stem Nut	ASTM A276 304 Stainless Steel
12	Diaphragm Washer	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
13	Spacer	ASTM A276 304 Stainless Steel
14	Quad Seal Retainer	ASTM A536 65-45-12 Epoxy Coated Ductile Iron
15	**O-Ring***	Buna-N (Nitrile)
16	Quad Seal Plate	ASTM A743 CF8M (316) Stainless Steel (8” and Smaller) ASTM B62 Bronze (10” and Larger)
17	**Seat Gasket***	Buna-N (Nitrile)

** Contained in Main Valve Repair Kit*

JB113 Junction Box



CERTIFIED ELECTRICIAN TO CONNECT MAIN POWER AND FS99 FLOW SENSOR TO JB113 JUNCTION BOX

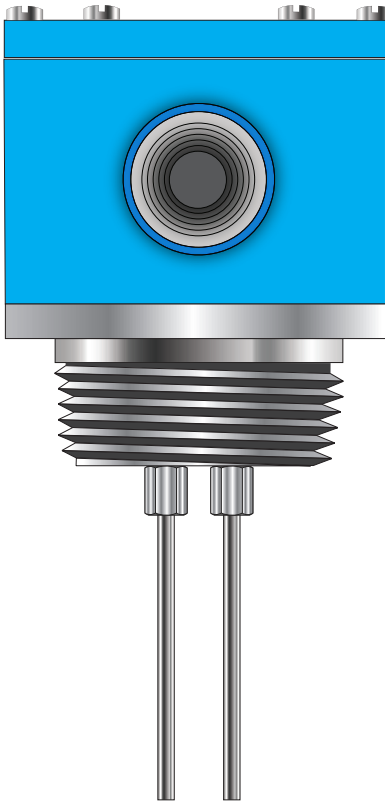
The valve mounted JB113 Junction Box is a lockable NEMA 4 enclosure equipped with an adjustable time delay, electrical relay and terminal strip. There are three 3/4 inch conduit connections. The valve solenoid is prewired.

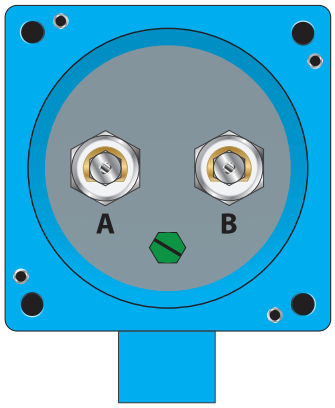
The valve is normally open and closes drip-tight when continuous relief valve discharge through the drain pipe is sensed by the FS99 Flow Sensor.

The valve mounted JB113 Junction Box is equipped with an adjustable time delay to avoid valve closure due to intermittent or nuisance relief valve discharge. The time delay is adjusable from 0-30 seconds.

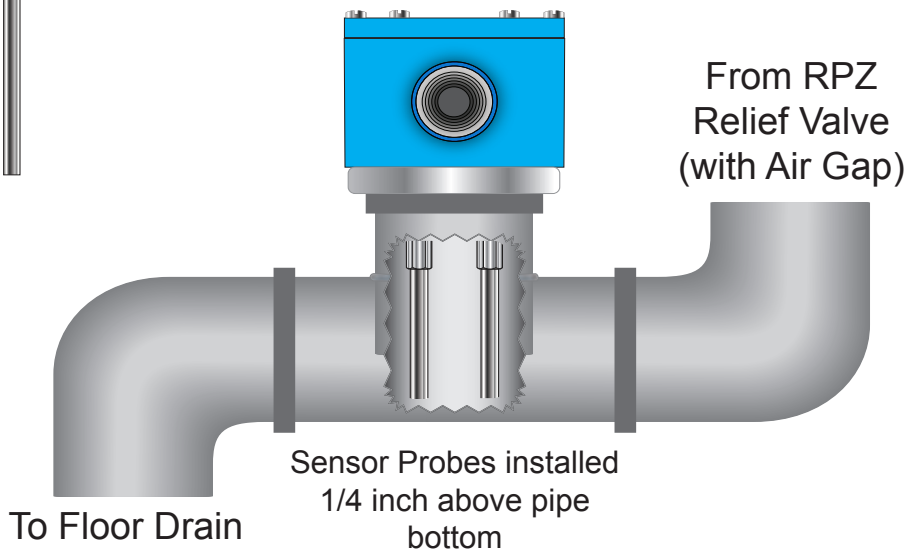
Adjusting the dial clockwise increases the time delay for valve closure. Adjusting the dial counterclockwise decreases the time delay for valve closure.

FS-99 Flow Sensor



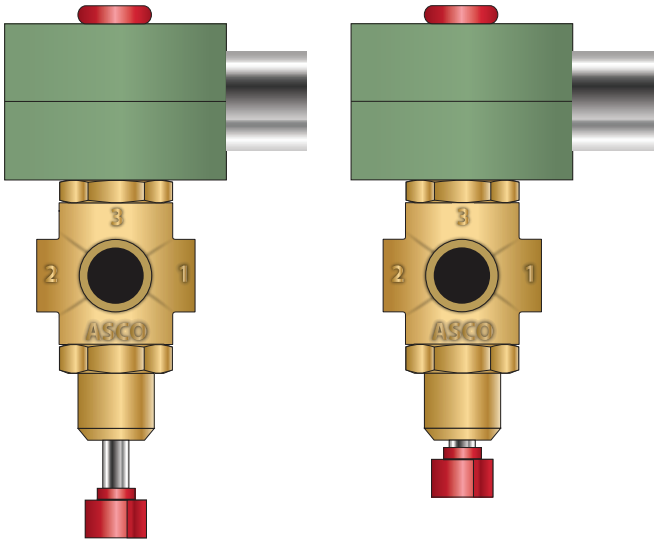


The FS99 Flow Sensor is field installed in the discharge piping from the RPZ Relief Valve. The FS99 senses water in the discharge piping signaling the JB113 Junction Box to close the valve.



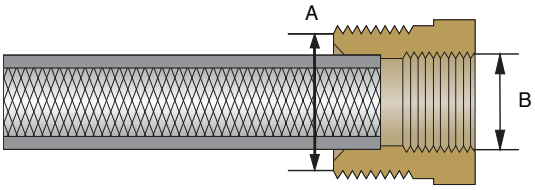
NOTE TO INSTALLING CONTRACTOR

- Client/Contractor to provide installation Tee for Flow Sensor.
- Install Flow Sensor in RPZ discharge line in HORIZONTAL position as shown.
- Sensor Probes should be cut to length and installed 1/4 inch above pipe bottom.
- ENSURE SENSOR PROBES DO NOT CONTACT PIPE BOTTOM OR SIDES.
- CERTIFIED ELECTRICIAN TO CONNECT MAIN POWER AND FS99 FLOW SENSOR TO JB113 JUNCTION BOX



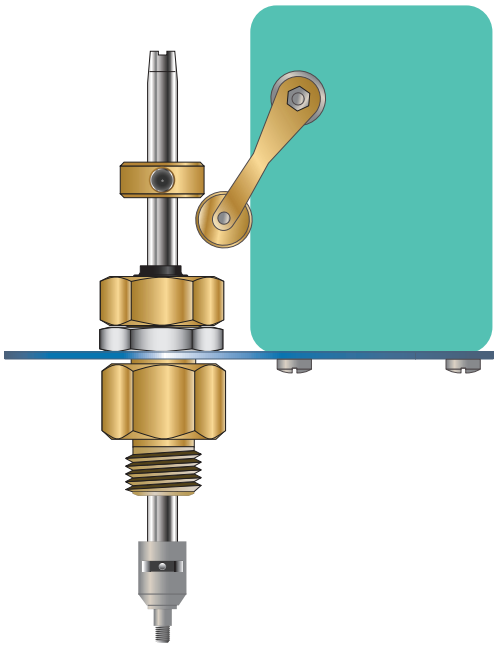
Disengaged **Engaged**

The valve Solenoid is prewired to the JB113 Junction Box and is equipped with a Manual Operator. Turning Manual Operator in (clockwise) approximatly 5-6 turns simulates electricity to the Solenoid. Turning Manual Operator out (counter-clockwise) returns the valve to electrical stand-by service. Manual operator must be disengaged for normal valve operation.



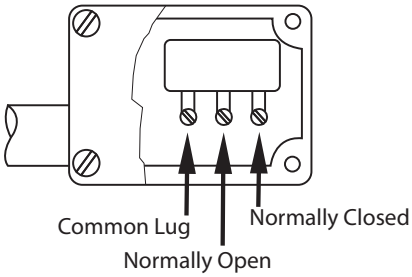
A	B	C
Male Pipe Thread (in)	Female Pipe Thread (in)	Length Thread (in)
1/4	1/8	11/16
3/8	1/4	7/8
1/2	3/8	7/8

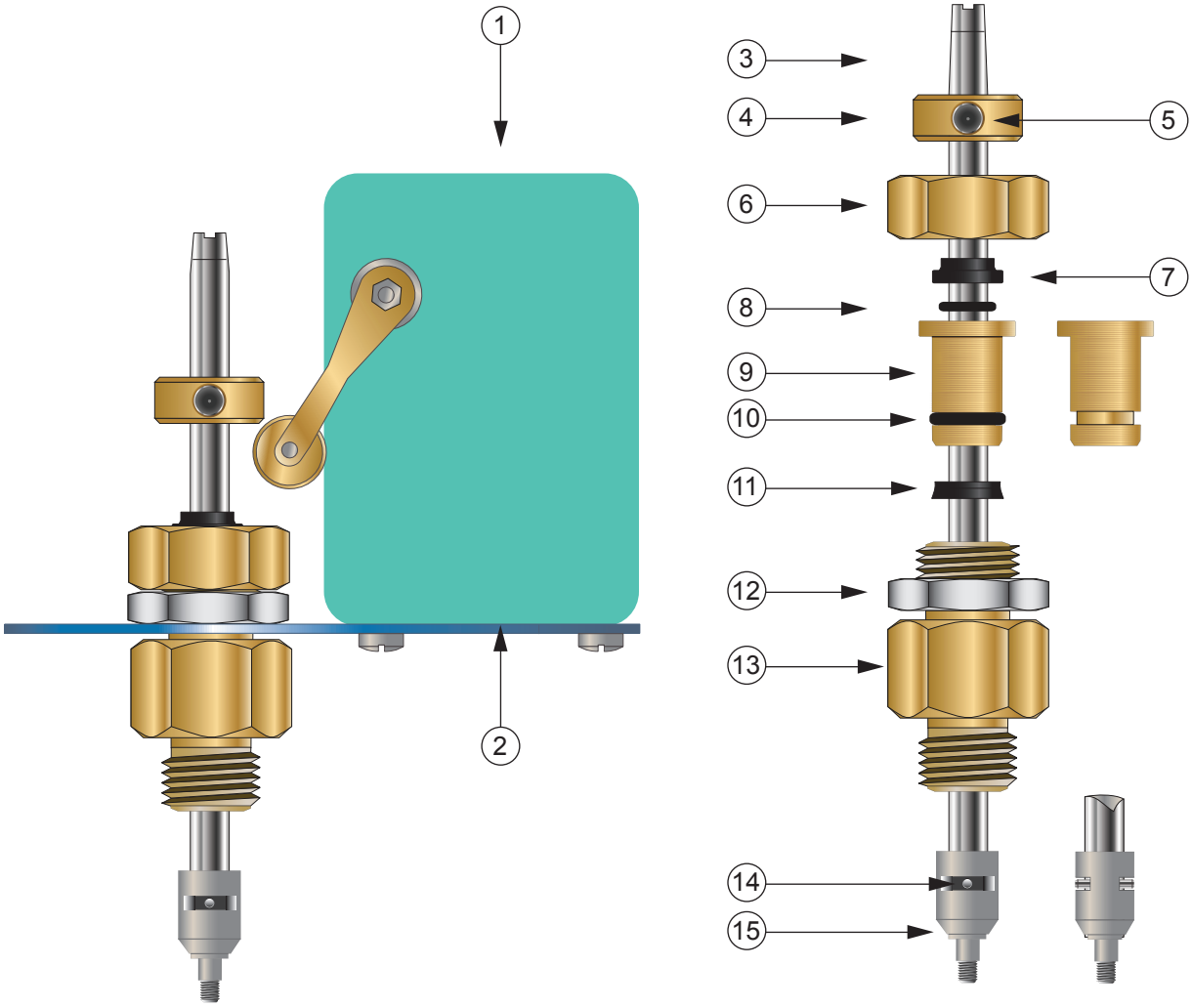
The valve pilot circuit is equipped with a Model 60 Flo-Clean Strainer which is used to filter the fluid passing through the control pilot circuit, and provide protection to pilot circuit speed controls and pilots. It is installed in the inlet body port of the main valve, exposing the strainer element to main line flow. The currents and flow across the screen create a self-scouring effect, cleaning the filter element.



The Model 51 Single Limit Switch provides local visual and remote electrical indication of valve position. The adjustable collar is set to contact the trip arm when the main valve is closed. The collar can be positioned on the stem by loosening the set-screw to actuate the switch upon valve closure. The single pole double throw Micro-Switch can be connected to the building monitoring system to indicate valve closure.

Single Pole Double Throw Switch





1	Limit Switch
2	Bracket
3	Stem
4	Trip collar
5	Set Screw
6	Cap
7	Wiper Ring*
8	O-Ring*
9	Guide
10	O-Ring*
11	Polypak*
12	Locknut
13	Body
14	Pin
15	Coupling

Installation

Control Valve

- Fully read all technical information provided.
- Prior to installation flush line to remove debris.
- Install valve upstream of the RPZ Backflow Assembly.
- For ease of valve service and electrical connections do not install valve vertically. Install valve horizontally “in line” (valve cover facing UP), so flow arrow matches flow through the line. Consult factory prior to ordering if installation requirements are other than described.
- Vertical installation of valves larger than 6” is not recommended and may result in poor valve performance and increased maintenance requirements.
- Install inlet and outlet isolation valves. NOTE: When using butterfly valves, insure disc does not contact control valve. Damage or improper valve seating may occur.
- Provide adequate clearance for valve servicing and maintenance.
- Install pressure gauges to monitor valve inlet and outlet pressure.
- Connect cover discharge control tubing to floor drain. Consult “Valve Cover Capacity” chart on page 2 to determine volume of cover fluid displaced when valve is operated.

FS99 Flow Sensor

- Install FS99 Flow Sensor HORIZONTALLY in RPZ Relief Valve discharge line for proper operation. Do not install vertically. Consult factory if flow sensor other than FS99 is used.
- Client / Contractor to provide 2” FNPT installation Tee for Flow Sensor. Sensor Probes must be field cut to length and installed 1/4” above pipe bottom for proper operation
- Insure sensor probes do not contact installation Tee bottom or sidewalls.
- Line Voltage to FS99 Flow Sensor is 10 volts maximum.

Electrical Connections

- Certified Electrician to connect JB113 Junction Box and FS99 Flow Sensor according to factory schematic to appropriate power source and terminal strip locations.
- Line Voltage to FS99 Flow Sensor is 10 volts.
- Power supply to JB113 Junction Box is 120 VAC 60HZ Single Phase.
- Connect Limit Switch (if equipped) to remote alarm or auxiliary connection as required by project specifications.
- Pre-set Time Delay to 15 seconds.
- Insure Solenoid is disengaged by turning Manual Operator counterclockwise (out / left).

Start-Up

Proper Automatic Control Valve start-up requires bringing the valve into service in a controlled manner. All adjustments to control pilots and speed controls should be made slowly, allowing the valve to respond and the system to stabilize. **NOTE: Control Valves should be set-up in a dynamic (flowing) condition for proper start-up. Provisions for flow must be made to insure proper settings.**

1. Refer to valve schematic. Disengage Solenoid by turning Manual Operator counterclockwise (out). Locate and open Manual Reset Ball Valve. Open upstream and downstream isolation valves to allow controlled filling of the Valve and Backflow Assembly. Open all Isolation Ball Valves.

2. Inlet pressure will open the valve fully. Close Manual Reset Ball Valve.

3. Engage Solenoid by turning (red) Manual Operator clockwise (in) to simulate electrical shutdown signal. Inlet pressure will be indicated on Pressure Gauge and valve will begin to close. Due to low / no flow condition, valve closure may be slower than normal operation. When valve is fully closed adjust Limit Switch trip arm and trip collar to actuate Limit Switch.

4. Disengage Solenoid by returning Manual Operator out (counterclockwise) and open Manual Reset Ball Valve. Pilot System Pressure Gauge will drop to zero. Valve will open fully and is ready for electrical activation. Allow for cover volume to discharge to floor drain. Refer to chart on Page 2 for Cover Chamber Volume. Close Manual Reset Ball Valve.

5. Open JB113 Junction Box. Apply power and observe the clear Electric Relay Control.

6. Pour adequate amount of water into RPZ Relief Valve Air Gap until the RED LED indicator light on the Electrical Relay illuminates / flashes. This indicates the FS99 Flow Sensor is properly installed and is sensing water in the discharge piping.

7. Trap water in discharge piping and observe RED LED on Electrical Relay. Solenoid will energize when duration of Adjust Time Delay elapses. Valve will go closed and must be manually reset. Adjust Time Delay to Customer / Project specifications. To manually reset valve refer to Step 4.

8. For final test simulate actual RPZ Relief Valve discharge and observe floor drain for excessive pooling or flooding. Re-adjust time delay and valve speed controls as needed to achieve desired valve closure time.

Specifications

The Flood Protection Shutdown Valve shall be a normally open Diaphragm Valve installed upstream of the Reduced Pressure Zone Backflow Assembly, and automatically close if the RPZ relief valve begins to discharge. A Time Delay supplied in the JB113 Junction Box shall prevent the valve from closing on intermittent discharges from the RPZ relief valve. If continuous Relief Valve discharge occurs, the FS99 Flow Sensor installed horizontally in the RPZ Relief Valve discharge piping shall send a signal to the JB113 Junction Box energizing Solenoid to close the main valve. Once closed the Flood Protection Shutdown Valve must be manually reset.

The JB113 Junction Box shall be valve mounted with the Solenoid pre-wired. The FS99 Flow Sensor shall be provided with the valve package and shall be field installed in a horizontal position in the RPZ Relief Valve discharge piping. Vertical installation of the Flow Sensor shall not be acceptable. The valve shall be equipped with a Limit Switch to provide local visual and remote electrical indication of valve closure.

The Reduced Pressure Zone Backflow Assembly, Flood Protection Shutdown Valve, JB113 Junction Box and FS99 Flow Sensor shall be provided by the same manufacturer and be covered by a single warranty policy.

The main valve shall be a hydraulically operated, single diaphragm actuated, globe or angle pattern valve. Y-pattern valves shall not be permitted. The valve shall contain a disc and diaphragm assembly that forms a sealed chamber below the valve cover, separating operating pressure from line pressure. The diaphragm shall be constructed of nylon reinforced Buna-N, and shall not seal directly against the valve seat and shall be fully supported by the valve body and cover. Rolling diaphragm construction will not be allowed and there shall be no pistons operating the main valve or any pilot controls.

The main valve body and cover shall be Ductile Iron ASTM A536, and all internal cast components shall be Ductile Iron or CF8M (316) Stainless Steel. All Ductile Iron components, including the body and cover, shall be lined and coated with an NSF 61 Certified Epoxy Coating applied by the electrostatic heat fusion process. All main valve throttling components (valve seat and disc guide) shall be Stainless Steel. The valve body and cover must be machined with a 360-degree locating lip to assure proper alignment.

The disc and diaphragm assembly shall contain a Buna-N synthetic rubber “Quad Seal” that is securely retained on 3-1/2 sides by a disc retainer and disc guide. Diaphragm assemblies utilizing bolts or cap screws for component retention will not be permitted. Direction of flow through the valve shall be the over-the-disc design, causing the valve to close upon diaphragm failure.

The exposed portion of the Quad Seal shall contact the valve seat and seal drip-tight. The disc and diaphragm assembly must be guided by two separate bearings, one installed in the valve cover and one concentrically located within the valve seat, to avoid deflection and assure positive disc-to-seat contact. Center guided valves will not be permitted. The main valve stem shall be Xylan coated to avoid the effects of mineral or hard water build-up. The main valve spring shall be the manufacturer’s heavy or extra heavy spring design. All necessary repairs shall be made from the top of the valve while the body remains in line.

The Pilot Control System shall contain a Flo-Clean Strainer, NEMA 4, 120 VAC 60HZ 3-Way Solenoid with Manual Operator, Manual Reset Ball Valve, Pressure Gauge, Single Limit Switch, JB113 Junction Box and Isolation Ball Valves on all body connections. The JB113 Junction Box shall be valve mounted and the FS99 Flow Sensor shall be field installed.

The valve shall be Watts Model 113-12RFP (globe) or 1113-12RFP (angle) Flood Protection Shutdown Valve.

For Health Hazard Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

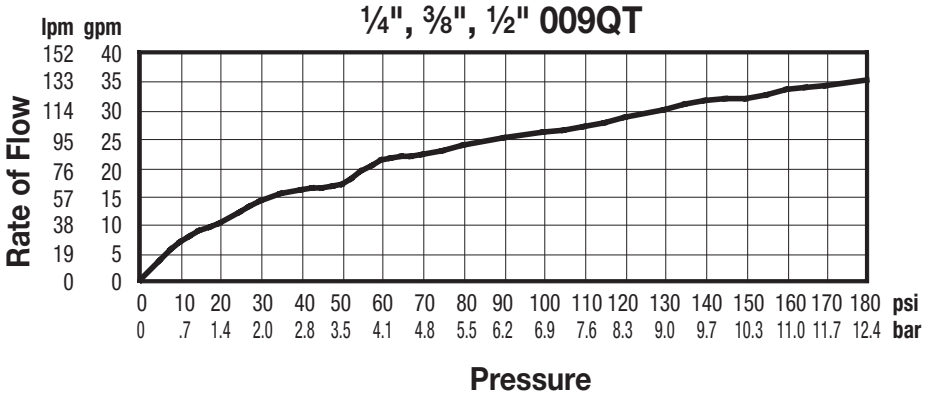
Engineer _____ Contractor's P.O. No. _____

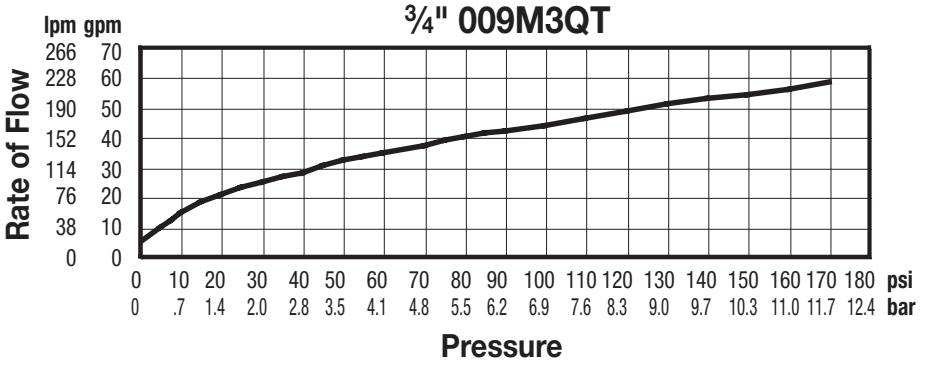
Approval _____ Representative _____

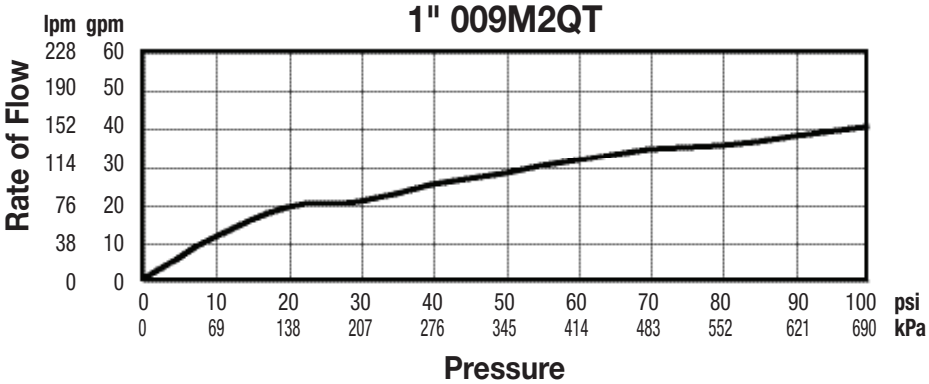
Series 009, 909, 919, 957 and 994

Reduced Pressure Zone Assemblies

Relief Valve Discharge Rates



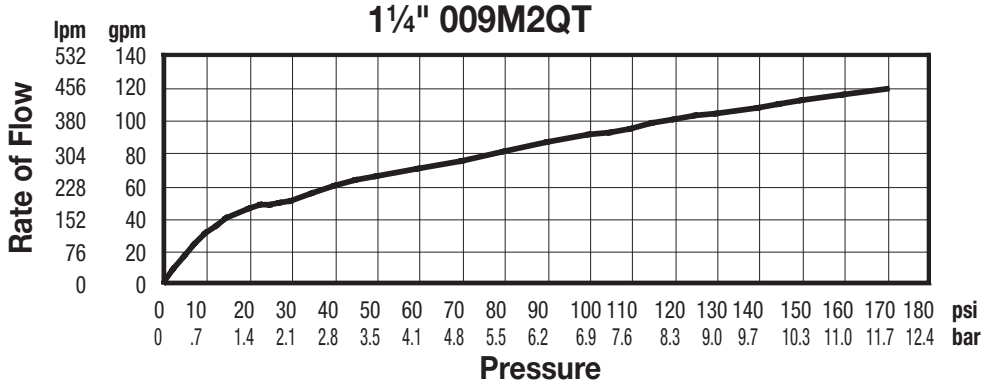




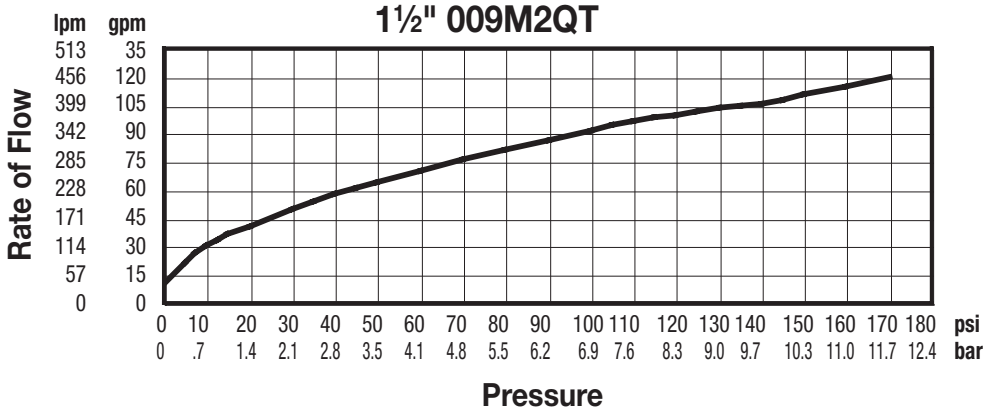
Note: These curves represent catastrophic or worst case discharge rates. These curves were developed by pressurizing the outlet of the backflow preventer with the second check valve's internals removed from the body.

WATTS®

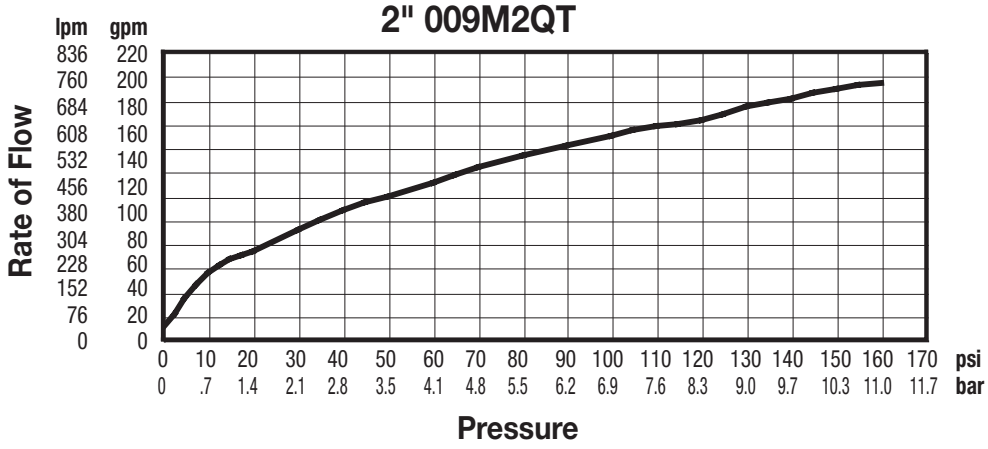
1¼" 009M2QT



1½" 009M2QT

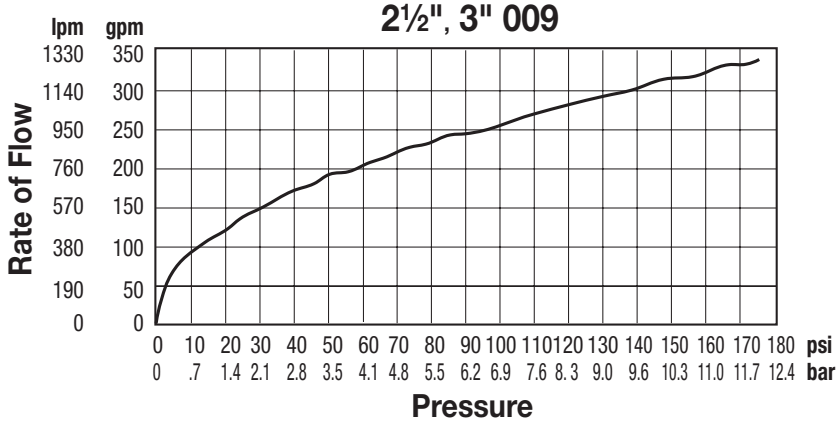


2" 009M2QT

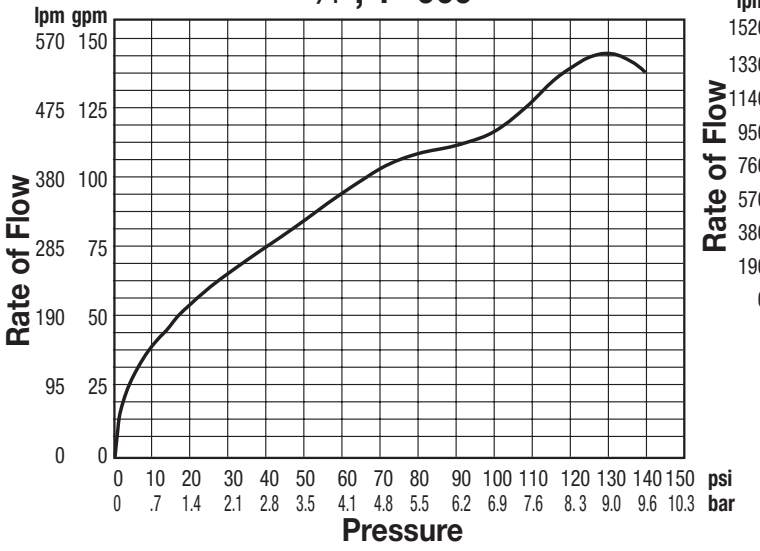


Note: These curves represent catastrophic or worst case discharge rates. These curves were developed by pressurizing the outlet of the backflow preventer with the second check valve's internals removed from the body.

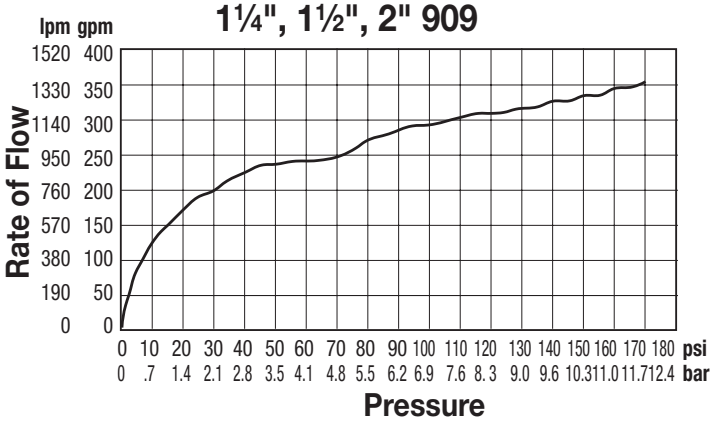
2½", 3" 009



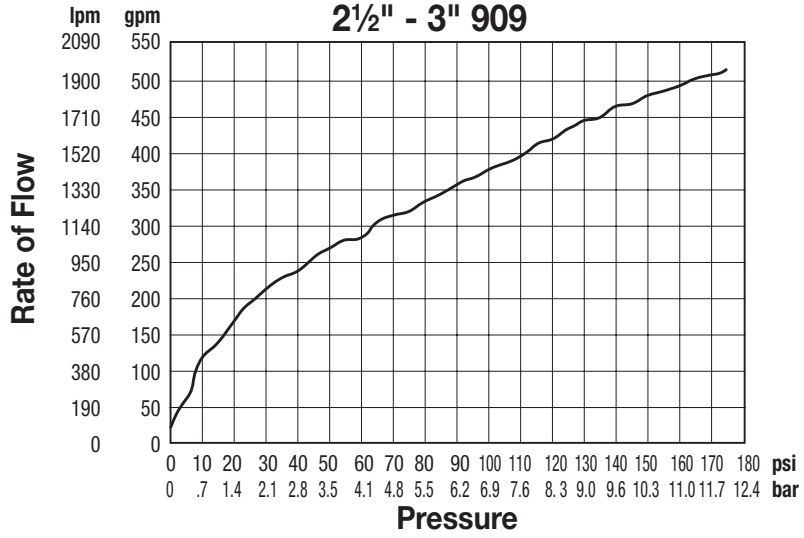
¾", 1" 909



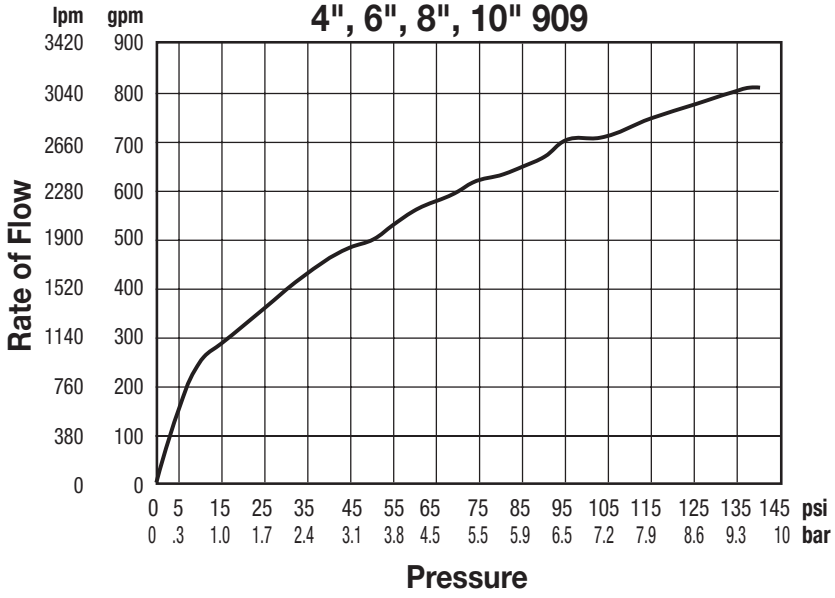
1¼", 1½", 2" 909



2½" - 3" 909

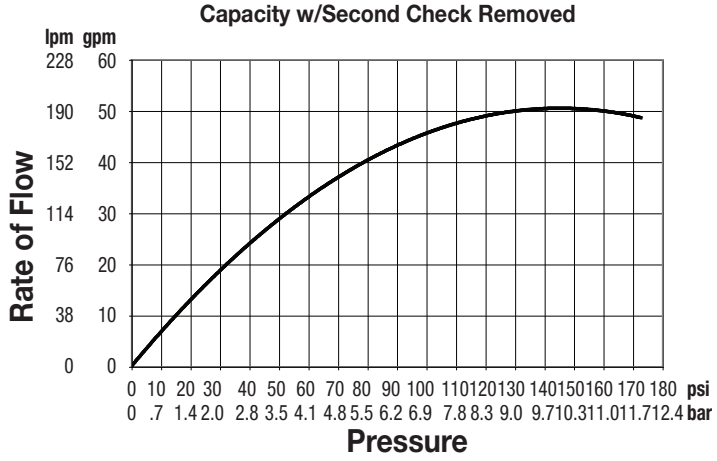


4", 6", 8", 10" 909

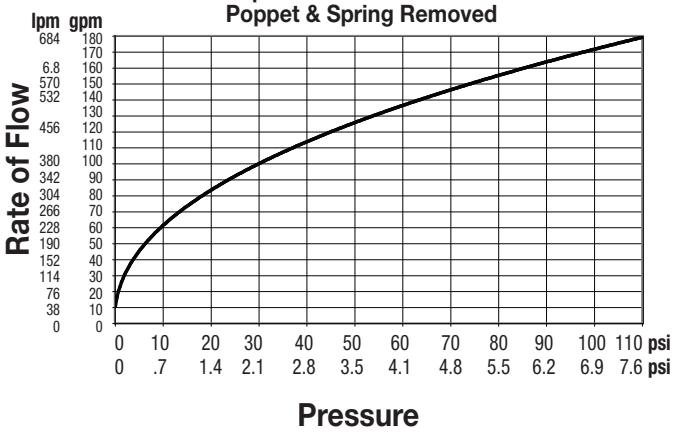


Note: These curves represent catastrophic or worst case discharge rates. These curves were developed by pressurizing the outlet of the backflow preventer with the second check valve's internals removed from the body.

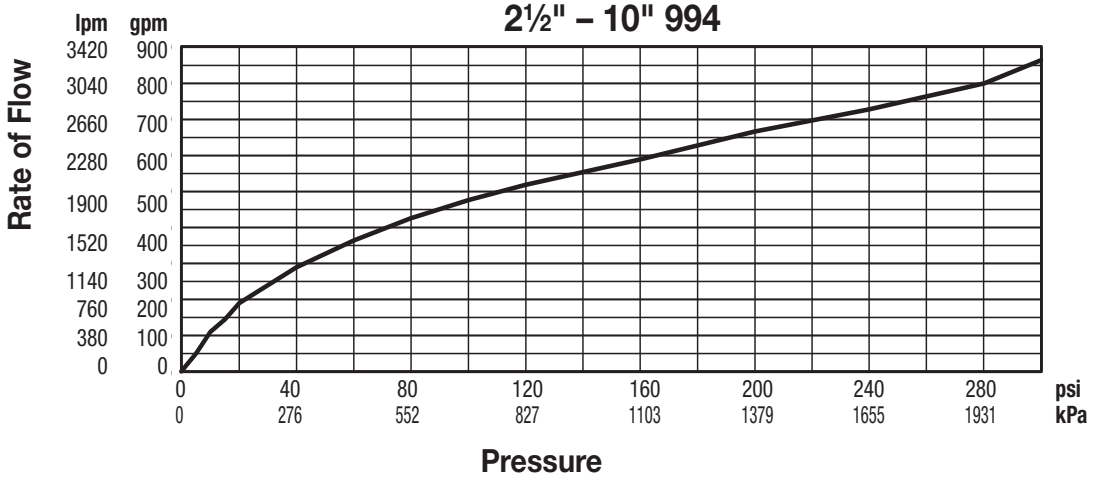
1" 919 RV
Capacity w/Second Check Removed



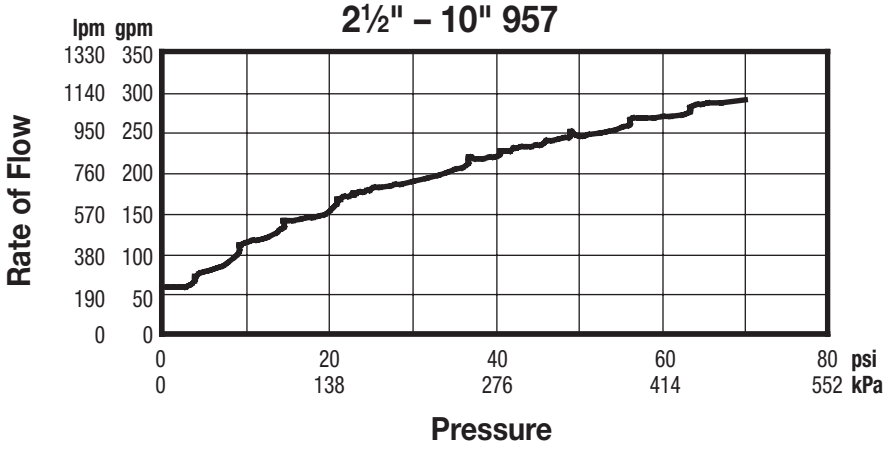
2" 919 QT
Backpressure w/Second Check Poppet & Spring Removed



2½" – 10" 994



2½" – 10" 957



Note: These curves represent catastrophic or worst case discharge rates. These curves were developed by pressurizing the outlet of the backflow preventer with the second check valve's internals removed from the body.

Typical Flow Rates as sized by floor drain manufacturers		Drain Size
gpm	lpm	
55	209	2
112	426	3
170	646	4
350	1330	5

USA: 815 Chestnut St., No. Andover, MA 01845-6098; www.watts.com
Canada: 5435 North Service Rd., Burlington, ONT. L7L 5H7; www.wattscanada.ca